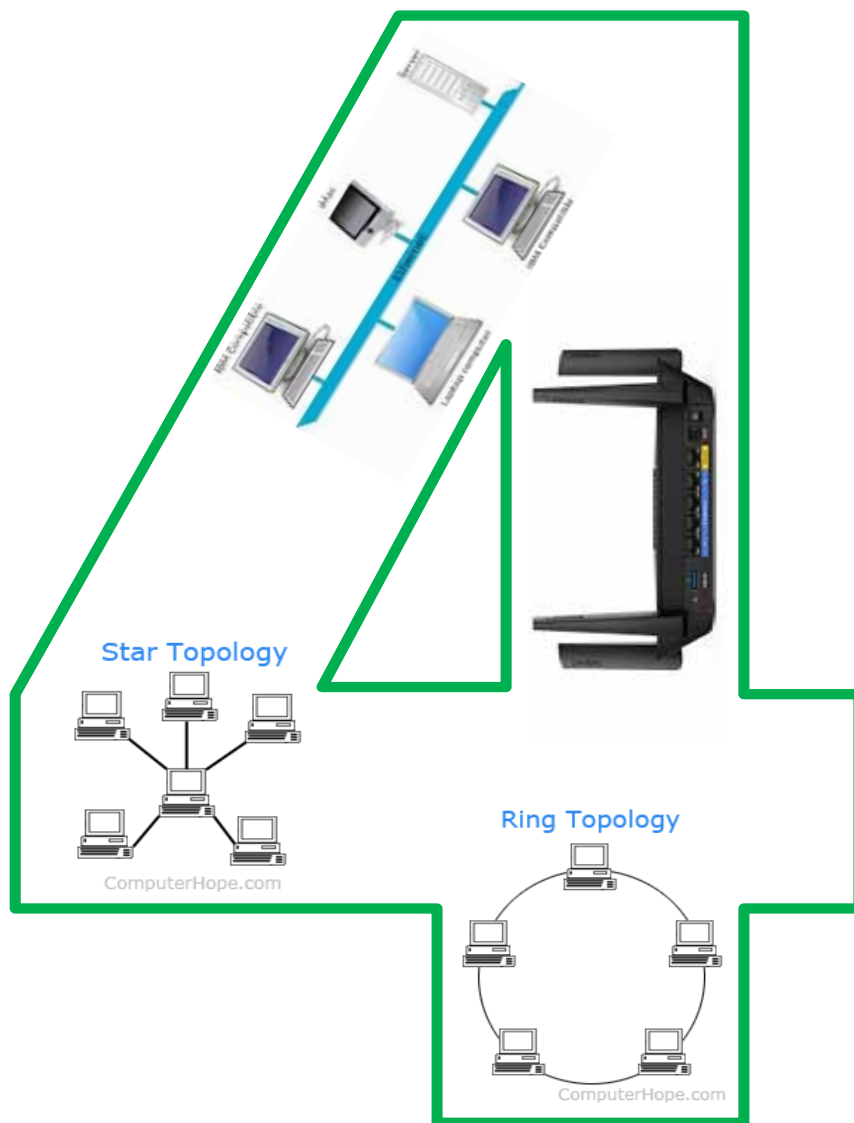
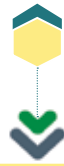


# Chapter 4

## Computer Networks and Internet







## Computer networks and internet

### Objectives

#### ➔ Main objectives:

1. Learn how to communicate between more than one computer through different types of networks.
2. Distinguishing between the Internet and the World Wide Web.

#### ➔ Sub-Objectives

After studying this semester, the student is expected to master the following knowledge and skills:

1. Defines the computer network and enumerates its benefits.
2. Distinguishes between different types of networks.
3. Enumerates the basic components for building a local network and factors that influence their choice.
4. Distinguishes between the Internet and the Web (www).
5. Distinguish between the web page and the site and how some different sites are categorized
6. Enumerates some of the basic features, functions and services of the Internet
7. Explains the types of internet connection lines.
8. Enumerates some types of Internet servers.
9. The Protocol is known and enumerates some of its types.
10. Defines search tools and distinguishes among its different types.
11. Recognizes search engine components.
12. Distinguishes between online search methods.
13. Recognizes the inclusion of shapes and symbols.
14. Master the insertion processes of Tables

## 4- 1 Networks Introduction

Computer networks have gone through many stages of development until they have reached what we are witnessing now, and are still evolving in terms of speed and proliferation and technology used in the hardware industry, data transfer and others. The idea of networks began in 1934 when the Belgian scientist Paul Oatley thought about collecting all information and disseminating it around the world through search engines and hyperlinks. Then, in 1940, the scientist George Steppittens was able to send a set of instructions to solve a matter from Dartmouth College by means of a teletype machine to a complex calculator in New York and then receive the results. In 1950, networks emerged by linking a set of computers to military radars (SAGE). SABRE then emerged by connecting two central computers in 1960. In 1964, the "SPARE" system for booking American Airlines tickets by IBM was introduced by IBM by connecting a group of computers estimated at 2,000 terminals in 65 cities with two concentrated IBM 7090 devices by telephone lines. In 1965 the first Wide Area Network (WAN) was introduced by the scientist Tomahas Marial. In 1969, four hosts were connected together as the beginning of the emergence of the ARPANET network at the end of 1971 Dennis C. Hayes invented the electronic mail. In 1973, the FTP was introduced and electronic communication was made among the University of London in England, the Royal Radar Foundation in England and the ARPANET American network. Dennis C. Hayes has invented a computer modem in 1977. In 1980, Novell Company announced a software system for personal computers, which led to a rapid development of local networks. In 1982 TCP/IP and Domain Name has appeared as gov and edu. In 1990, the language of the Hypertext Markup Language (HTML) appeared as a starting point for the World Wide Web. In 1996, the scientist Brantt invented a 56-kilobyte modem. In 2005, cloud computing technology emerged, fiber optics emerged in 2011, and Wi-Fi in 2014. The development of computer networks continues to increase day by day to bring in new services, improve existing services, address existing problems, as well as improve performance, speed and security for users of networks around the world.

### Skill 4 - 1 knowing Computer Network



Computer network definition: Is a group of computers and other devices connected to each other to share resources (hardware and software) and exchange and transfer data and information.

Figure 4.1 gives an example of a small network made up of a number of computers and accessories (printer and scanner) and a device to connect network components and lines of communication.

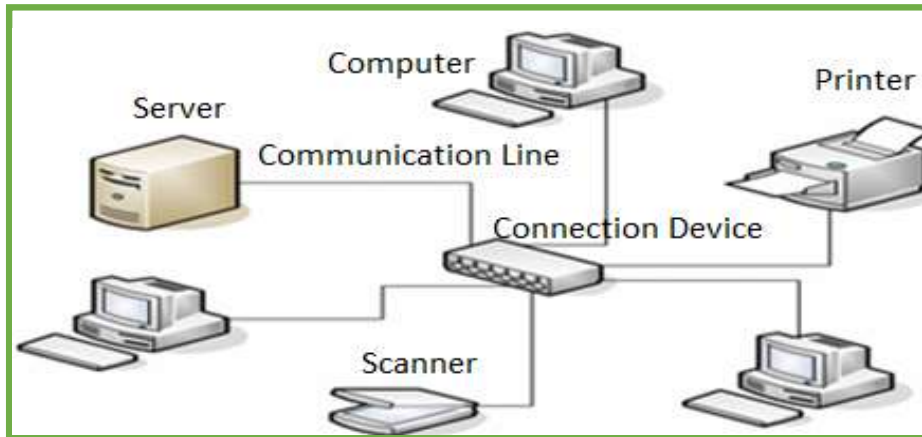


Figure 4-1  
Simple  
Model for  
Computer  
Network

### Skill 4 - 2

Ability to count some Importance of Computer Networks for users



## 4- 2 Network Importance

*There are many benefits for computer network users, including:*

- Share programs, data and information.
- Device sharing: such as printer, scanner, storage devices, etc.
- The possibility of expanding the area covered by the network and increasing the number of computers and other devices at the lowest cost.
- The ability to communicate and exchange messages and files between users via email. Saving time, effort and money in data transfer
- The ability to centralize the network by the network administrator, which eases the burden of solving problems on users.

### Skill 4 - 3

The ability to Classify Networks



## 4 -3 Networks Types

*Computer networks can be classified on the basis of several factors, including:*

- Geographic network coverage
- How to connect network components together
- Network devices communication method
- The type of media, as shown in the figure (4- 2).

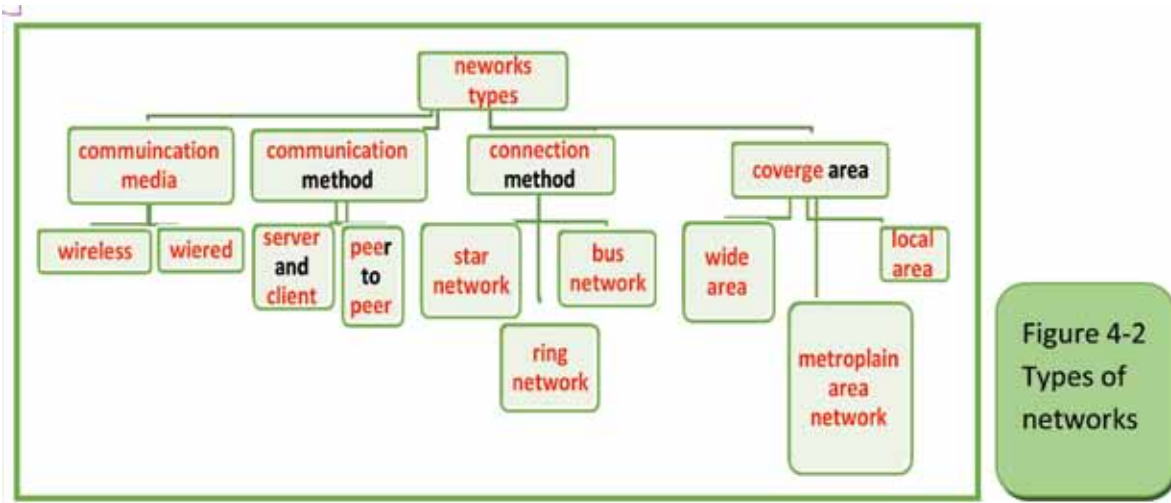


Figure 4-2  
Types of networks

**Skill 4 - 4**  
The ability to classify networks in terms of geographic coverage area

**4 -3 -1 NetworksTypes According to the Geographic Coverage Area**

Computer networks are divided according to the area they cover or the geographical extension they cover into three types:

**Skill 4 - 5**  
Identify the local Area Network and mention its characteristics.

**First: Local Area Network (LAN)**

Local Area Network definition: - A computer network that is used within a specific area (a floor in a building or a building or several adjacent buildings). Figure (4 -3) gives an example of a small local network within an office or laboratory.

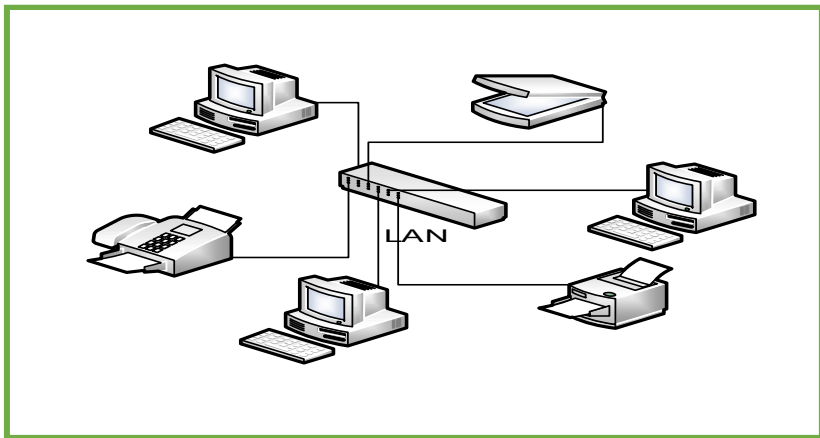


Figure 4-3  
Local Area Network model

**Local Area Network attributes**

- Used in a limited space such as one or two adjacent buildings up to 2000 meters
- For a single company or organization
- Number of computers from (2) to about 500
- High speed from 4 Mbps to 1000 Mbps.
- High efficiency because it is a limited network in terms of the number of devices, space and software.
- Low cost because it does not require expensive hardware, software and transportation.

**Skill 4 - 6**

Identify the Metropolitan Area Network and mention its characteristics



**Second: Metropolitan Area Network (MAN):**

Metropolitan Area Network definition: A computer network that is used within an entire city or two adjacent cities. It consists of a number of local networks connected to each other as in the figure (4 -4). It may be used fiber optic in connecting this type of network.

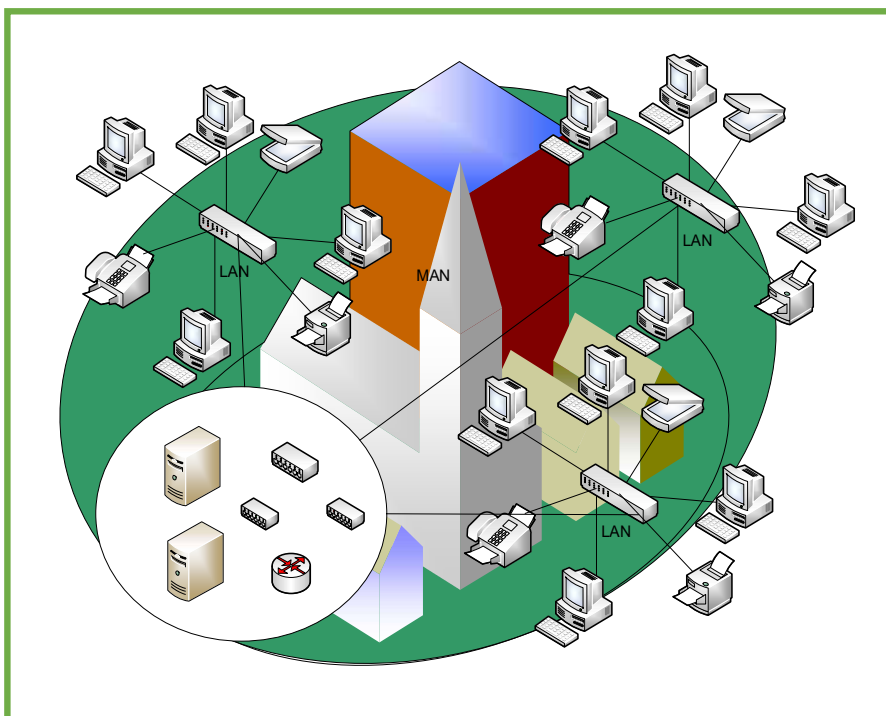


Figure 4-4  
Metropolitan  
Area  
Network  
model

**Metropolitan Area Network attributes:**

- Used at the level of one or two neighboring cities
- For an institution or a number of institutions.
- The number of computers is about a few thousand
- Consists of a number of local networks
- Speed is relatively slower than local networks and relatively faster than broadband.
- Efficiency is lower than the LAN because it uses more devices and longer distances.
- Higher cost than local networks

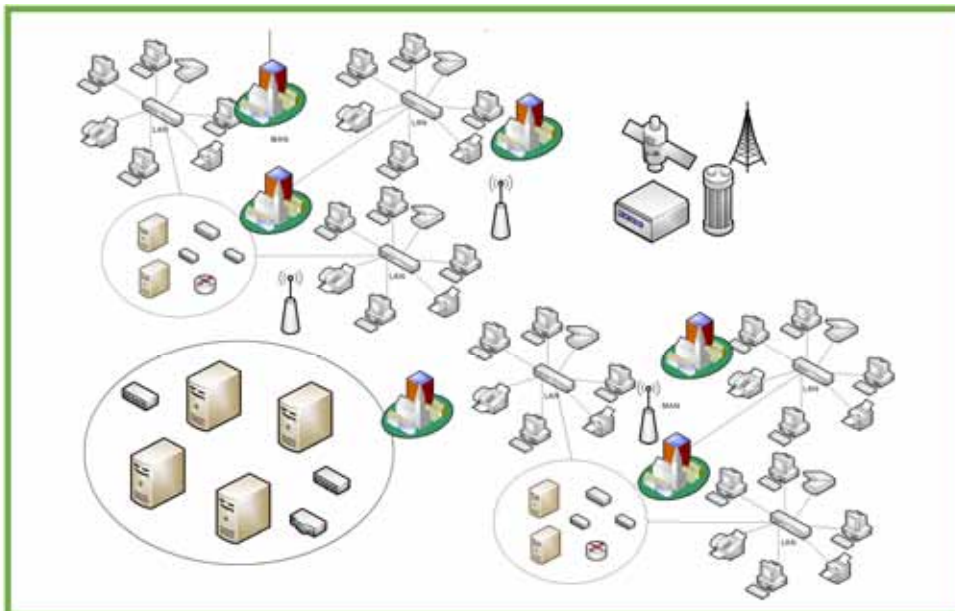
**Skill 4 - 7**

Recognize the wide network and mention its characteristics.



**Third Wide Area Network (WAN)**

Wide Area Network definition: It is a network that spans a wide geographical area or across continents that allows the exchange of data and information across countries and continents between network users. It consists of a number of Metropolitan Area Networks as in the figure (4- 5).




**Figure 4-5  
Wide Area  
Network  
model**




**WideArea Network attributes**

- Used at the level of one or several countries, they are the largest networks.
- For an institution or a number of institutions.
- The number of computers is very large.
- Consists of a number of regional networks.
- Speed is relatively slower than other networks.
- Less efficiency than other networks.
- Cost is higher than other networks

**Skill 4 - 8**  
Comparison of network types according to terms of area. 

From the above it is clear that there are many differences between network types according to terms of area. Table 4.1 shows some of these differences.

Comparison Factor	Local Area Network	Metropolitan Area Network	Wide Area Network
area	Limited area	One or more adjacent cities	Large area across countries and continents
speed	High	medium	Varied
No. of users	Small	big	Huge
construction	A group of computers, accessories and other devices	A group of local networks	A group of Metropolitan Area Network
cost	Lowest cost	More cost than local	The highest cost

**Skill 4 - 9**  
The ability to categorize networks in terms of communication media. 

**4 -3- 2 Types of networks in terms of communication media.**

Communication Media definition: These are the means used to connect devices connected to the network with each other and through them the data are transferred. Networks in terms of the type of communication media are divided into wired networks and wireless networks as shown in figure 4 -6.

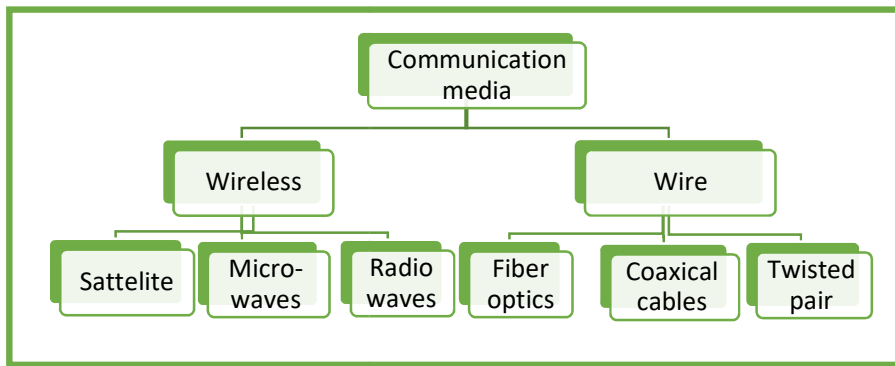



Figure 4-6  
Communication media types

**Skill 4 - 10**  
Identify wired communication media and distinguish its types.



The following is an explanation of each of them:

**First: wired networks**

These networks rely on the use of wires to transmit data and communicate between users and devices. There are many types of wired media, so-called wires or cables (Wired Data Transmission Media). Some of the most famous of these types are:

- Twisted Pairs.
- Coaxial Cables.
- Fiber optics.

**1. Twisted Pairs**

The twisted pair cable consists of a set of twisted pairs, covered with an external protective layer of insulating material as in the figure (4 -7). One of its advantages is that it is cheap, but the speed of data transfer on it is slow, especially when sending and receiving multimedia data.



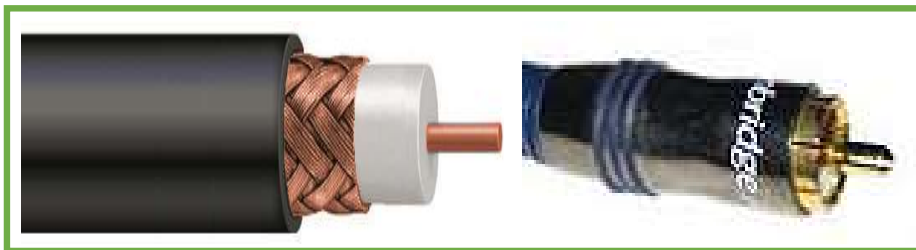
Figure 4-7  
Twisted Pair

### *Twisted pair features*

- Cheap price.
- Easy to install.
- The most used media.
- Twisted pair disadvantage
- Data transfer speed is less than 100 Mbps.
- Do not use in long distances.
- Easy eavesdropping and steal of information.

## **2. Coaxial Cables**

The coaxial cables consist of a copper wire to transmit signals, a protective material surrounding it and a metal net surrounding the insulation material and act as a ground end to reduce noise and distortion in the signal and then a plastic insulating outer layer as in the figure (48-). It is one of the most common types after twisted pair. It's very similar to a TV cable. One of its advantages is that it is faster than twisted pair and is used to send and receive multimedia data as well as for longer distances.



**Figure 4-8**  
**Coaxial**  
**Cables**

### *Coaxial Cable features*

- Easy to install.
- Higher speed than scheduled.
- Use for longer distances than twisted pair.
- Resists the factors affecting the signal better than twisted pair.
- Can be used to send data in multimedia format

### *Coaxial Cable disadvantage*

- The cost is relatively higher than twisted wires.
- Easy eavesdropping and theft of information.
- Is affected by external distortion factors, but less than twisted wires.
- Can be eavesdropped and data stolen

### 3. Fiber Optics

Fiber optics are a very thin flexible glass tube through which information is transmitted at the speed of light as in the figure (4- 9). It is very fast and secure in the transmission of information and longer distances. But they need to be careful in dealing with them so as not to damage them. They are also high, and they are characterized by the high cost of manufacturing and installation.



**Figure 4-9**  
**Fiber**  
**Optics**

#### *Fiber Optic Features*

- Lighter and smaller than other wire types.
- Higher speed than other types.
- Used in long distances (hundreds of kilometers).
- It cannot eavesdrop and information was stolen.

#### *Fiber optic disadvantage*

- More expensive than other types of wires.
- Cut able (break from the inside) and bend.
- Difficulty of installation and need special equipment.

Here's a simple comparison between wired media types as in table (4- 2).

**Table 4.2 Comparison of wired media types**

<b>Comparison Factor</b>	<b>Twisted Pair</b>	<b>Coaxial Cable</b>	<b>Fiber Optics</b>
cost	low	medium	High
speed	low	medium	High
Type of transmitted data	preferred to be text	Could be multimedia	Could be multimedia
distance	Small and it need signal amplifier (repeater ) 1100-m	Longer than twisted wires 1500-m	very long distance compared with twisted wires
Weakness of signal with the distance	high	low	Very low

**Skill 4 - 11**

Identify the wireless media and distinguish among its types.

**Second: Wireless Media**

These networks rely on the use of wireless waves to transmit data and communicate between users and devices. There is now a significant development in wireless data transmission media due to its multiple features and the demand for people to use it to meet their needs for continued connectivity to the network with mobility, mobility, etc. There are many types of wireless data transmission, including:

- Using Radio Wave
- Using Microwave
- Using Satellite
- Using Infrared

**1. Radio Wave**

Used to transmit sound and image. The frequency is between 10 and 100 kHz.

Features of radio waves

- Travelling for hundreds of kilometers
- Penetrates buildings

**2. Microwave**

Microwaves use electromagnetic waves to transmit signals and data. Frequency between 100 MHz and 100 GHz.

**Microwave advantages**

- Very high speed.
- Preferred in remote and isolated areas of wire types.
- It may be cheaper and easier than wiring in the case of commercial and important areas.

**Microwave disadvantages: -**

- Difficulty installing.
- Exposed to many factors of distortion.

**3. Satellite**

Satellites also use microwaves to send and receive signals and data.  
Satellite features

- Very high speed.
- Microwave defects
- Difficulty installing.
- Exposed to many factors of distortion

#### **4. Infrared**

Infrared is used within limited areas such as one room and sends the signal in a straight and frequency between 100 GHz and 100 THz.

##### ***Infrared features***

- Very high speed
- Signals cannot eavesdrop and data were stolen.

##### ***Infrared defects***

- Do not use in long distances.
- Signals must be sent in straight lines.
- Signals are exposed to many distortion factors from the surrounding environment

#### **5. Bluetooth system**

##### ***Bluetooth features***

- Not affected by external factors affecting the signal
- Low cost

##### ***Disadvantages of the Bluetooth system:***

- Up to a few meters in range

#### **6. Wi-Fi System**

It has become one of the most used systems especially in homes, shops, hotels and others.

##### ***Wi-Fi features***

- Low cost.
- Provides security and protection for transmitted data.
- Complies with a number of devices

#### **7. Wi-MAX System**

It is similar to The Wi-Fi and has a range of more than 50 km and data transfer speed of up to 70 Mbps.

**Skill 4 - 12**

The ability to categorize networks in terms of the way they connect.

**4-3-3 Types of networks according to connection method**

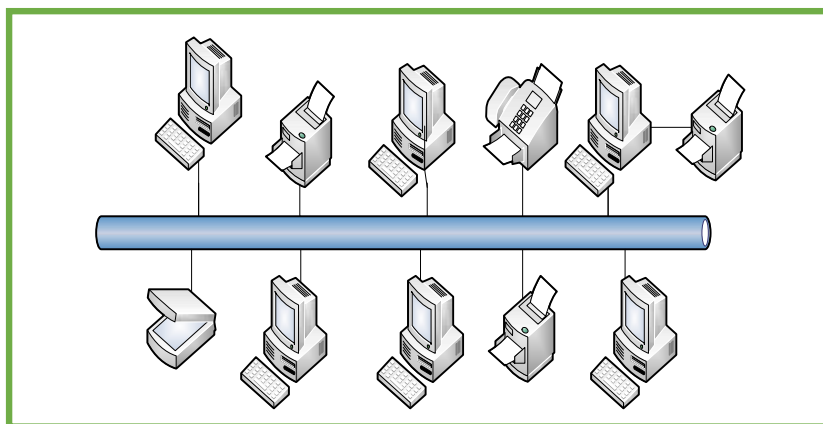
There are many types of networks in terms of network form or network topologies. Here are some of these types:

**Skill 4 - 13**

Recognize the Bus Network and mention its characteristics.

**First: Bus Network**

The Bus Network is one of the simplest forms of networks. It consists of a main cable to which all devices are connected by a set of subcables as in the figure (4-10). All devices are sent from this main cable and can only be read from device to which the data is transmitted.



**Figure 4-10**  
**Buss**  
**Network**

**Bus network features**

- Cheap cost.
- Easy installation and connection.
- The network does not crash if a computer crashes.

**BusNetwork disadvantage**

- Terminator must be installed on both sides.
- Network speed and efficiency are influenced by the number of devices
- The network is disabled if the main cable crashes.

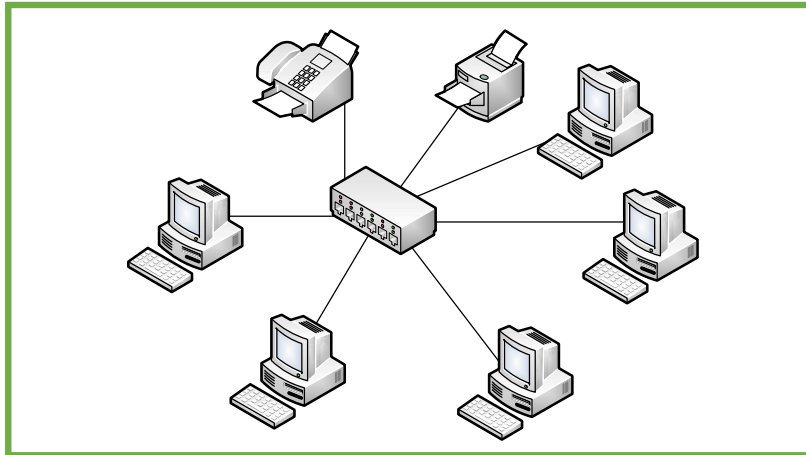
### Skill 4 - 14

Recognize the Star Network and mention its characteristics.



#### **Second Star Network**

In the Star Network, all devices are connected to a connection device called a switch or HUB regulator as in the figure (4- 11). Computers send data, for example, to the distributor who strengthens it and then sends it to the beneficiary.



**Figure 4-11**  
**Star**  
**Network**

#### **Star Network advantages**

- Easy control of the network and its management.
- Easy installation and maintenance.
- High speed
- Do not disable the network if a computer crashes or a subcable is broken.

#### **Star network disadvantages**

- Distributor crashes cause the entire network to crash.
- The high cost of having a distributor and many cables.
- The number of devices in the network depends on the number of ports in the distributor.

### Skill 4 - 15

Recognize the ring Network and mention its characteristics.



#### **Third: Ring Network**

In the Ring Network, the devices are connected to each other in the form of a closed path and a loop as in the figure (4- 12). This network does not contain the



main cable and a distribution device so each device that receives data and tests it if it is sent to it and retains it otherwise it will be sent back to the next device, and so on until the device sent to it receives it. Therefore, if there is a problem with a device connected to the network, it can affect the network. If the network is equipped with two separate paths, if one path is disabled, the other is used.

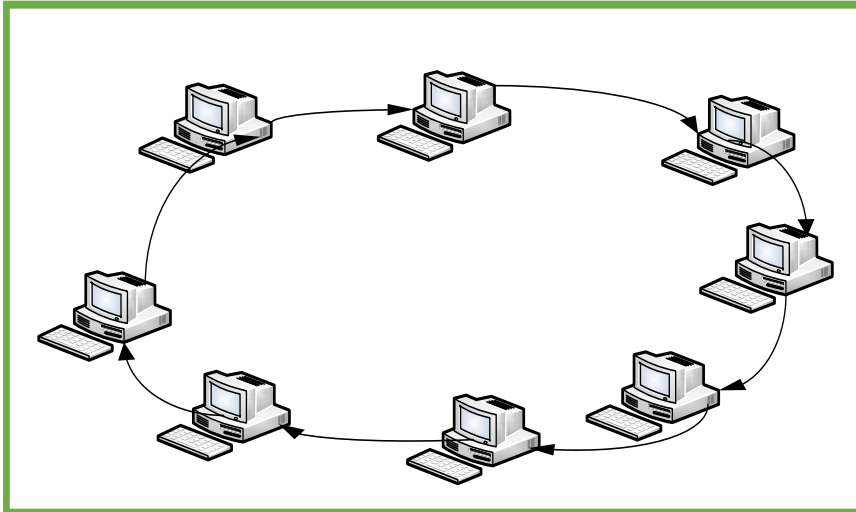


Figure 4-12  
Ring  
Network

#### **Ring Network disadvantages**

- Easy installation and connection.
- Cheap costs

#### **Ring Network disadvantages**

- Slow speed
- If a device crashes, the entire network is shut down
- When a problem occurs, it is difficult to identify
- Can't more than one data transmitter at a time.

#### **Skill 4 - 16**

The ability to categorize networks in terms of communication methods.



#### **4- 3- 3 Types of Networks in terms of Communication Method**

There are two types of networks depending on the method of communication (or network configuration)

### Skill 4 - 17

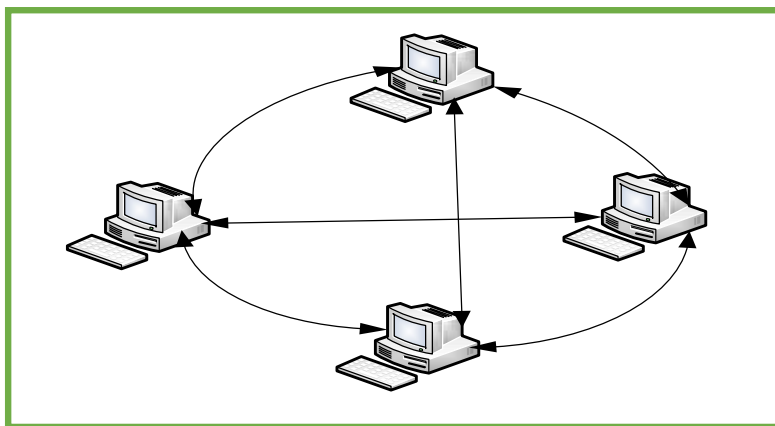
Recognize the peer-to-peer network and mention its characteristics.



#### **First: Peer to Peer Networks**

Peer to peer network definition: Are a group of equivalent devices directly connected to each other.

This type of small local networks, such as a home network or an office network, is to create a working group among users to share available resources. It does not require a server or a central device with high storage or processing capabilities, because any device can be a server or client at the same time and has its own security system. Figure 4.13 gives an example of peer-to-peernetwork. There are operating systems that support this type, such as Windows for Workgroups.



**Figure 4-13  
Pair to Pair  
Network**

#### **Peer-to-peer network advantages:**

- Easy installation and setup
- Low costs do not need server or difficult settings.
- You don't need additional software on the operating system.

#### **Disadvantages of peer-to-peer network**

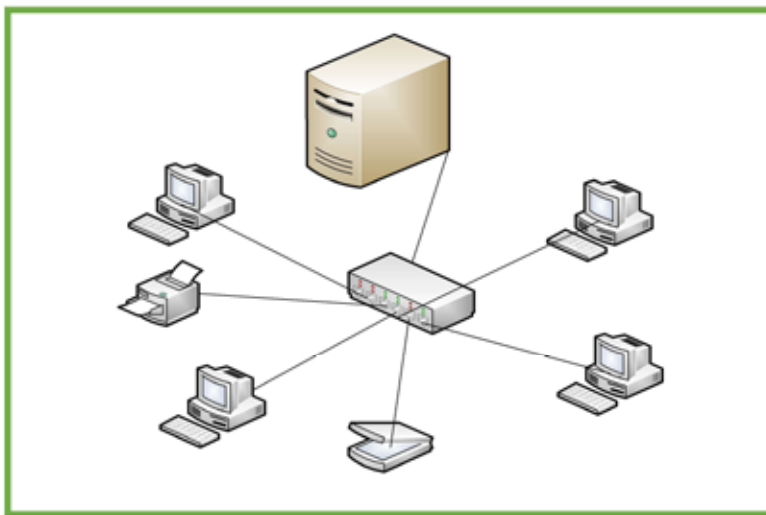
- The number of devices is limited (ten devices) they are not suitable for large networks.
- Difficulty dealing with the network in the case of a large number of devices
- Unsafe.
- It is difficult to back up

**Skill 4 - 18**

Recognize the server and client network and mention its properties.

**Second: Client and Server Network****Client and Server Network definition:**

It is a set of devices (client) connected to a central device (server) that contains data and software and controls the reception and transmission of data between connected devices and manages most processes on the network as in the figure (4- 14). This network may contain more than one server depending on the size of the network, the amount and nature of the work and tasks required by the network. They are more suitable for large companies and banks.



**Figure 4-14**  
**Client**  
**Server**  
**Network**

**Advantages of server and client networks**

- Can handle thousands of devices
- Easy to backup
- Easy modification and control of the network and its management
- Easy data and network security
- The possibility of increasing the number of devices and software at any time and easily
- Server and client network disadvantages
- High cost of having a high-specification server and other devices
- Server failure causes the entire network to stop.

**Skill 4 - 19**

Comparison between Peer-to-Peer network and server and client network.



The following is a comparison between the peer-to-peer network and the server and client network as in table 4- 3.

**Table 4.3 Comparison of network types in terms of communication style**

Comparison Factor	Peer to peer network	Client and server network
Cost	Low cost	High cost cause need server
Number of devices	Limited 10 devices as maximum	can include large number of computers
Network services and management	Distributed on all connected computers	Centralized only on server
Access to the data and information	Information is difficult to access as the number of devices increases	Easy access to information and data because it positioned in the server
Development, modification and maintenance	Difficult to develop and maintain as a result of decentralized management	Easy to develop and maintain as a result of central management
network security	It is difficult to secure, especially when increasing the number of devices because each device needs its own security.	Easy to secure as a result of centralized management that makes server security a network insurance

**Skill 4 - 20**

Identify the basic components required to build a local network.



**4- 4Required Componentsto make a local Network**

The required components vary from network to network due to many factors, including:

- Number of devices to be connected to the network
- Network coverage area and distance between devices
- Geographical nature of the location (wired or wireless)

- Centralize data, information, software, management and control (peer-to-peer or server and client)
- The type of data and information that is sent and received over the network (text, images, video, voice)
- The amount of data to be traded over the network per second (data speed)
- The amount of data, information and software to be stored on the network
- The required level of security.
- available financial support.

**However, there are a number of basic components found in most networks:**

- At least 2 computers
- Network Interface Card(NIC): The number of NIC equal the number of connected devices in the network. They are used to connect devices to the means of communication (cables). There are types of them:
  - Built in link cards.
  - Connecting cards purchased and installed on the device.
- The type of means of communication or data transfer, controls the type of network card, including:
  - Wired network link card
  - Wireless network link card
- Media (wired or wireless)
- Network Operating System operating system)
- Devices that connect and connect devices to each other (Switch distributor - Hub organizer - router network router)

### Skill 4 - 21

Learn about the evolution of the Internet.



## 4- 5 Introduction to the Evolution of the Internet

The Internet, sometimes simply called 'Net', is a global network of computer networks - a network in which users through one computer, if they have permission can obtain information from any other computers (and sometimes speak directly to users on other computers). The U.S. Department of Defense (Pentagon) laid the foundation for the Internet nearly 30 years ago with ARPANET. However, the general person did not use the Internet much even after the development of the World Wide Web in the early 1990s.

The World Wide Web or Textile emerged in 1991, thanks to developer Tim Berners-Lee and others at CERN. The CERN team created the protocol based on

hypertext that makes it possible to connect content on the web with hyperlinks. Berners Lee now manages the World Wide Web Consortium (W3C), a group of industry and university representatives that oversee web technology standards.

By the end of 1992, Delphi provided full internet access to its subscribers; followed by many other service providers. In June 1993, the Internet was filled with only 130 sites. By one year, the number had risen to nearly 3,000 sites. By April 1998, there were more than 2.2 million websites. Today, the Internet has become a public, cooperative and self-sustaining facility accessible to hundreds of millions of people around the world. Physically, the Internet uses part of the total resources of existing public communications networks. Technically, what distinguishes the Internet is its use of a set of protocols called 'TCP/IP' and means transmission control protocol/IP. To view files on the web, you need a web browser. You can use this program to view different websites, known as web pages. A collection of web pages is a web site. The first page of the Web site is often called the home page.

Just as every home in the world has a unique address, every web page in the world has a unique Internet address, sometimes called the URL. For example, the Internet home address for Windows is: <http://www.microsoft.com/windows>.

**Skill 4 - 22**  
learn about the Internet



**Internet definition:**

A global network with a huge collection of different networks connected to each other and distributed all over the world with the aim of exchanging and sharing with each other. It is called a network or an abbreviation of the global network (INTERNationalNETwork) or INTERconnectingNETworks)

Internet network have expanded and spread and included within them all kinds of networks (WAN/MAN/LAN) and therefore are not owned by a particular party or country.

**Skill 4 - 23**  
A distinction between the Internet and the Web.



**4- 6 Deference between Web and Internet**

**World Wide Web (WWW) definition:**

It is a service that obtains information stored on the Internet through a huge

collection of pages or websites. The World Wide Web is a user interface for the Internet. It consists of a huge collection of hypertext documents stored on the Internet. They are accessed and handled through a program called a browser. Many of these browsers include Google Chrome, Internet Explorer and Mozilla.

**Skill 4 - 24**

Learn about the Web Browser and Distinguish between Page and Site.



**Browser definition:** Browser is a program that lets you view web pages and images of content over the Internet.

**Web Page Definition:** A document that uses multimedia (text, image, voice, and video) to display information directly or through a set of interconnected text documents to open other pages or play files. It is called a page for abbreviation.

**Web Site definition:** A collection of web pages those are interconnected to provide a range of information. It is called a site for abbreviation.

**Site components: The site consists of:**

- Home Page or Home Page
- A collection of Content Page
- A set of hyper-linking links to link pages together.

The definition of the home page: is the front page of the site and usually contains the name and logo of the site, a welcome phrase, pictures, an index of the contents of the site and a set of cross-sectional links to move to different content pages and may also contain a set of hyperlinks to a range of sites related to the site.

**Content page definition:** A page or pages that contains the information to be displayed to the user.

**Skill 4 - 25**

Learn about Website Components and Types.

**4 -7 Types of Websites**

There are many factors that control the type or classification of the site such as:

**A. Owner of the site:**

- Private Sites

- Government sites: Government sites end up with their internet address.gov
- Corporate sites: Organization Sites and its Internet address ends with.org

**Content (services and information provided by the site) including:**

- Information sites and their Internet address ends with.inf
- Communication Services Sites and their Internet address ends with.comm
- E-newspaper and magazine websites
- E-education sites and their internet address ends with .edu
- E-commerce sites
- Commercial site their internet address ends with .com
- Entertainment Sites

**A. Interaction with the user**

- Static site or non-interactive sites called web 1.0: sites allowed the user is only reading it only. Do not allow the addition, deletion, or editing of its contents.
- Dynamic Sites, Interactive Sites or Web 2.0: sites that allow the user to interact with content from add-on, deleting, or editing.

**Skill 4 - 26**

Enumerate some of the features of the Web.



**4 -8 Internet Features**

**The Internet offers many features such as:**

- A huge collection of information in various areas that are constantly renewed.
- Easy and fast access to information anywhere in the world.
- Easy and fast communication with millions of people from all over the world directly.
- Watch and interact with international news and events as soon as they happen.

**Skill 4 - 27**

Learn about some of the uses of the Web.



**4 -9 BasicUses of the Internet**

The services provided by the Internet are numerous and varied, but we will mention some of them in Table 4- 4. Note that all of the services mentioned can be used in the educational and research process.



Table 4.4 Description of some basic Internet services

Service	Description
World Wide Web (WWW)	This service is most widespread and used to obtain the required information in its various forms on the Internet through the browser explorer program.
E-mail	E-mail service is a powerful service that has led to the spread of the Internet in all community circles. The message (text, voice, video) can be sent instantly, unlike other means. The message can be read and answered at any time.
File Transfer Protocol (FTP)	Upload and Download Files is an online file sharing and download service. So you can store (upload) your files and documents online and upload them at the worst time you want.
Internet Chat	This service helps users to communicate and interact with each other by writing, chatting, or sending files, whether in the form of photos, sounds or video.

**Skill 4 - 28**

Distinguish among types of Internet connection lines.



**4.10 Types of Internet Connection Lines**

**A. Internet connection is done in two steps- :**

1. Contact with your Internet Service Provider (ISP) and request to subscribe to the Internet.
2. Choose a means (lines) to connect to the Internet because each medium has its own speed and cost.

**B. Types of Internet connection lines**

The types of internet connection lines are divided into two types:

**Wire Telecommunications:**

- Dial-Up: In which the public telephone network (Public Switched Telephone Network (PSTN) is used, which is one of the most widely used types of communication lines due to its licenses and spread, but it is the slowest types where its speed reaches about 56 kbps and the telephone line is also busy for the duration of internet use. The connection is done using a modem that is connected to your ISP.

To know the role of the modem: We should know that the computer only deals with data in the form of Digital Signal, while data travels over telephone lines in the form of analog signals. Therefore, a device that converts from digital to

analogue signals should be used to send it over telephone lines and then reverse analogue signals to digital signals to receive data from telephone lines and can be handled by the computer (modem).

A modem is a device that converts the digital signal into analogue and vice versa. The word modem is an abbreviation of two words: modulation, conversion of digital signals to analogue signals, and demodulation, conversion from analogue to digital signals.

### ***Integrated Service Digital Network (ISDN)***

It is a network that offers many services, including the allocation of a telephone channel and an Internet channel at the same time on the same cable, so that the phone line will not be busy when using the Internet. The signals are transmitted digitally. It reaches a speed of about 64 kbps if you use one channel or 128 kbps when using the two channels.

### ***Digital Subscriber Line (DSL)***

A line that allows internet access and download information at speeds of up to 512 kbps.

### ***Asymmetric Digital Subscriber Line (ADSL)***

A fast internet connection with a speed of 256 kbps.

### ***Leased Line***

A special line rented by companies or agencies to connect their employees to the Internet permanently and at high speed ranging from 56 kbps to 45 Mbps.

### ***Fiber Optic***

Fiber optic cable is a very thin tube of flexible glass through which the data is transmitted in the form of pulses of light (each pulse represents a bit) and this tube is covered with a plastic cover. So the data travels at the speed of light.

### ***Wireless Communications:***

- Wi-Fi: a type of high-speed wireless connection. Radio waves are used to transmit data instead of wires.
- Satellite communication: This connection is very fast and covers very high areas regardless of the geographical nature of these places. But it is burdened with high cost.

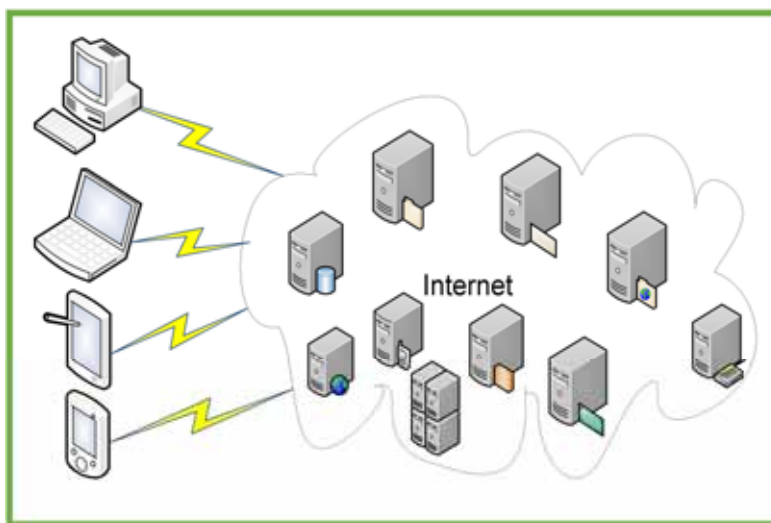
## 4- 11 ServersTypes

### Skill 4 - 29

learn about the Server and identify some types of Internet Servers.



Server definition: It is a computer with high specifications (processor speed - memory space and storage ... It provides data and services to other devices. The server can be a PC or device specifically designed to be a server. The Internet is actually based on a huge number of your servers in the figure of (4- 15).



**Figure 4-15**  
Some  
Servers  
used in  
Internet

**There are many types of servers, such as:**

1. Web Server Definition: Is the software responsible for providing web pages, their irradiated or hypertext, and linked text, voice, image or video of the user (web browser) and hosting web pages.
2. Email Server Definition is software provides user email server services to create an account, manage mail servers, send and receive an e-mail, as well as provide space for storing and sharing various documents, etc.
3. Application Server Definition: Software provides a suitable operating environment for running a range of applications and is handled and accessed by the Application Program Interface (API).
4. Database Server definition: software contains an application or applications for a database that operates and manages the database and allows other devices to deal with it.
5. Domain Name System server: A software stores information about domain

names in the internet database, linking page names and information to domain names, for example, when typing the website of The University of Bisha <http://www.ub.edu.sa> on any browser, converted by DNS to the host server address of the university's website, which is <http://51.211.174.136/>

### Skill 4 - 30

Identify search tools and distinguish among their types with examples and identify search engine components.



## 4 -12 Search Tools

Definition of search tools: A set of software that is used in the search to access data and software distributed on the Internet. There are three types of research tools as in the figure (4 -16)



**Figure 4-16**  
**Search Tools**  
**Types**

**Search Engine:** A system that helps in the search for information stored in the World Wide Web and review ranked results. Among the most famous examples: Google chrome - AltaVista –HotBot and Infoseek. In the practical part, we will be exposed to the most famous search engines and how to use one of them.

The search engine consists of three programs interconnected together as in the figure (4- 17)

Spider Program is a collection of programs used to explore and collect information about web pages in a database.

- **Index Program:** The program indexes and arranges the database. Search and order methods vary from engine to engine.
- **Search Program:** receives key words from the user through the Search Box searches for them in the indexed database, and then displays the user's ranked search results.

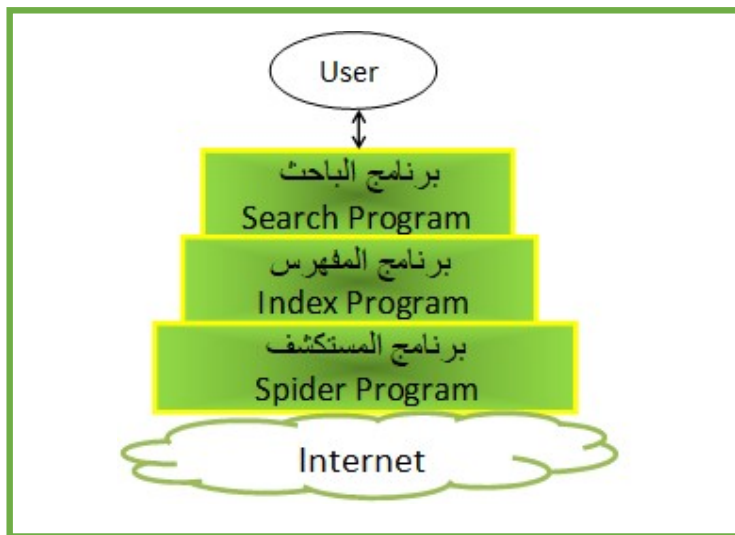


Figure 4-17  
Search  
Engine  
Component

**Search Directories:** It is a program very similar to the search engine in terms of use and work but different from that of the person who is doing the exploration and searches on the Internet is a human crew and not a program. As a result of the presence of the human crew in the process of exploration and the collection of information about the pages, search results are more accurate than the search engine but limited in engine coverage. One of the most popular search guides is Yahoo (DMOZ) and DMOZ (DMOZ)

**Meta-Search Engine:** The engine does not contain a database of web pages but do the search using other search engines and then display the results to the user. Like Info (Info.com), Mamma(Mamma.com)

### Skill 4 - 31

Definition of the Protocol and some examples of it.



## 4 -13 Types of Protocols

Protocol definition: It is a set of rules and procedures that govern and regulate communication and interaction among network-connected devices and how data is transmitted. There are many types of these protocols, such as:

### Types of protocols:

#### 1. TCP/IP (Transmission Control Protocol/Internet Protocol)

This protocol uses in the Internet to identify the transmitted and received devices and then the data is sent and received between them.

## 2. HTTP (Hyper-Text Transfer Protocol)

It is responsible for the connection between the web server and the web browser in the user's device, the HTTP protocol is used to send a request from your device (client) via the browser to the web server, and to receive in the form of web pages from the server to the client's browser.

## 3. HTTPS Protocol (Secure HTTP)

HTTPS is responsible for the secure communication between the web server and the web browser, the HTTPS protocol is based on the execution of financial and personal transactions such as the use of credit cards and other private data.

## 4. FTP (File Transfer Protocol)

This service is a TCP/IP application that makes it possible to transfer files between different computers connected to the Internet.

### Skill 4 - 32

Distinguish between the Internet Search methods.



## 4- 14 Internet Search Methods

### *There are two ways to search in the Internet*

1. Simple Search: A method used by the majority, especially beginners, in which only a word or search words is entered without any signs or symbols and then searched for them. Therefore, simple search results are inaccurate.
2. Advanced Search: In this search, we use with keywords (search words) a set of mathematical symbols (e.g., -,\*) or logical ((And, Or, Not) or special tags such as (';?), etc. The results are accurate. We will explain in detail with examples of the tags and symbols used in the advanced search in practical application in Chapter 12

## 4 -15 General Tips to Run Search in Internet

### Skill 4 - 33

Identify Internet Search steps efficiently.



- Select what you want to look for in a set of words
- Use different formulas for these words (singular, Plural, synonyms)
- Make no effort to use prepositions, kindness, identification tools, etc. as Search engines neglect all of it.

- It is preferable to use specialized search engines in your field of search (there are a group of search engines specialized in certain areas such as medicine, engineering, economics, scientific research and periodicals) and if you do not find use general search engines such as Google.
- Use advanced search for accurate results.
- Use more than one search engine if you don't get the desired results.
- Be aware of the main topic you are looking for and sub-topics so that you do not get distracted and you don't get interfered with the information.
- determine which search engine you will use to learn about the data and specialized topics and how to use it optimally.